EXHIBIT 7

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

IN RE METHYL TERTIARY BUTYL ETHER ("MTBE") PRODUCTS LIABILITY LITIGATION

Master File No. 1:00-1898
MDL 1358 (SAS)
M21-88

This document pertains to:

City of New York v. Amerada Hess Corp., et al.
04 Civ. 3417

EXPERT REPORT OF ROBERT N. STAVINS

ROBERT N. STAVINS

January 23, 2009

4. As part of my work in this case, I have studied various documents that pertain to the development and implementation of EPA's RFG program, including materials in the docket for EPA's RFG rulemaking. I have also studied various documents that pertain to the benefits and costs of ethanol production and use, including more recent EPA reports and academic literature. A list of the documents that I have considered in forming my opinions in this case is provided in Appendix C.

5. My work is ongoing, and I may update and revise my conclusions.

6. I am being compensated for my work in this case at the rate of $750 per hour. Part of the work for this investigation was performed by others working under my direction.

7. Based on my expertise, as described above, and my review of the materials listed in Appendix C, I have reached the following conclusions, which I discuss in the sections below.

II. Summary of Opinions

A. Summary of Opinions on EPA's Development and Assessment of the RFG Standards

8. **Final RFG standards were not published in the Federal Register until 1994.** While the Clean Air Act Amendments of 1990 (CAAA) established a framework for the RFG program, they did not establish all of the specific RFG standards. Rather, Congress set minimum requirements and directed EPA to set specific standards that would require the greatest emission reductions achievable, taking into consideration costs, energy requirements, and other factors. EPA's final RFG standards were published in the Federal Register in February 1994.

9. **EPA explicitly anticipated widespread MTBE use in RFG.** Required by statute to consider the environmental, economic, and energy implications of its RFG standards, EPA set those standards so as to strike a balance among their environmental benefits, economic costs, and energy impacts. EPA found that its chosen standards were appropriate based on analyses of the standards' environmental, economic, and energy implications in which EPA explicitly anticipated widespread use of methyl tertiary butyl ether (MTBE) in RFG.

10. **EPA's expectation of MTBE use fundamentally affected its assessment of the RFG standards.** Ethanol and MTBE differ in many respects, including their effects on the emissions targeted by the RFG standards. Through its RFG standards, EPA sought to reduce toxics emissions year-round and to reduce gasoline volatility during the summertime. Ethanol-blended RFG achieves fewer toxics reductions than does MTBE-blended RFG. Moreover, ethanol significantly increases gasoline volatility, while MTBE does not. To offset ethanol's volatility effect, refiners must modify their gasoline, which requires capital investments, increases refining costs, and reduces the volume of RFG that they can produce. The adverse economic and energy consequences associated with offsetting ethanol's volatility effect are avoided by using MTBE in RFG. As a result of these differences between ethanol and MTBE, the balance among the RFG standards' environmental, economic, and energy implications that EPA struck depended on EPA's presumption of widespread MTBE use. That balance would have been fundamentally altered by the exclusive use of ethanol in RFG.

11. **According to EPA's analysis, the Phase I volatile organic compound (VOC) emission standards were unachievable using only ethanol.** EPA's own assessment indicated that, because of ethanol's volatility effect, the refining industry could not have achieved EPA's Phase I (1995 to 1999) RFG standards for VOC emissions using only ethanol in RFG. EPA recognized ethanol's effect on gasoline volatility and set Phase I VOC standards that required refiners to meet the lowest achievable gasoline volatility level, based on assessments that assumed refiners would use MTBE, and not ethanol, to meet those standards. Given the additional reduction in volatility that would have been required to meet those standards if refiners used ethanol, EPA set Phase I VOC standards that, by its own assessment, effectively required widespread MTBE use.

12. **Both EPA and certain state regulatory authorities expressed concern about ethanol use in RFG.** During the development of the RFG regulations, EPA expressed concerns about the impacts on nitrogen oxide (NO_x) and VOC emissions if ethanol were used in summertime RFG. Moreover, certain state regulatory authorities – namely, the New York Department of Environmental Conservation (NY DEC) and the Northeast States for Coordinated Air Use Management (NESCAUM), an association of northeast state air pollution control agencies –

expressed concern about the environmental implications of efforts to increase ethanol use in RFG above anticipated levels, even in winter RFG.

13. **Uncertainty regarding ethanol use in RFG existed until at least 1994.** Together with actions taken by EPA in its RFG rulemaking process, these expressions of concern would have created significant uncertainty for refiners contemplating ethanol use instead of MTBE use in the early 1990s. For example, refiners would not have known the extent of the refinery modifications that would have been necessary to use ethanol instead of MTBE in RFG immediately after the passage of the CAAA because both the RFG emissions standards and EPA's determinations regarding the relationships between fuel characteristics and resulting emissions remained uncertain until the February 1994 final RFG rule. EPA indicated as early as 1991 that it was presuming widespread MTBE use when evaluating the emissions and economic implications of potential standards. The Phase I RFG standards that EPA proposed in April 1992 made clear that EPA would set standards requiring the greatest reductions in emissions that EPA deemed achievable under the presumption of widespread MTBE use.

B. Summary of Opinions Regarding Social Costs of Ethanol Use in RFG

14. **The reports submitted by Mr. Herwick, Mr. Tallett, and Dr. Whitelaw on behalf of the Plaintiff do not provide complete assessments of the social impacts of increased production and use of ethanol, nor do they claim to have provided such complete assessments.** A benefit-cost analysis of policies to encourage ethanol use would consider the full range of benefits and costs of ethanol production and use, including environmental externalities and any other indirect benefits or costs that might result. It would also specify the scenarios that are being compared (e.g., the use of MTBE-blended RFG instead of ethanol-blended RFG) and would measure all benefits and costs in the context of that comparison. Furthermore, it would distinguish between benefits and costs to society and impacts that only represent redistributions (transfers) of welfare among different groups. The reports by Mr. Herwick, Mr. Tallett, and Dr. Whitelaw do not meet these guidelines and should not be interpreted as providing complete assessments of the social impacts of increased production and use of ethanol.

B. EPA Explicitly Anticipated Widespread MTBE Use in RFG

20. The CAAA required EPA to consider environmental, economic, and energy impacts when setting RFG standards. To comply with this statutory requirement, EPA relied on analyses of the standards' emissions, economic, and energy implications.[11]

21. Throughout its analyses of the proposed standards' emissions, economic, and energy implications, EPA explicitly anticipated widespread MTBE use. In its first regulatory impact analysis (RIA) of the proposed standards, EPA stated that "[a]lthough other oxygenates, for instance ethanol and TAME, can be used in reformulated gasoline, it is assumed that they will not be used if their costs exceed that of MTBE."[12] In that RIA and in additional analyses performed at the time, EPA's assessment of the standards anticipated no ethanol use in RFG during the summer, when RFG standards limit emissions of VOCs and nitrogen oxides (NO_x) in order to reduce ozone.[13] Later EPA modeling for the final RFG rule predicted that MTBE, ethanol, and TAME respectively would account for 90 percent, 8 percent, and 2 percent of oxygenate volume in Phase I summer RFG, and that ethanol use would be even lower in Phase II summer RFG.[14]

22. In April 1992, EPA proposed Phase I RFG standards for VOC, toxics, and NO_x emissions that again depended fundamentally on its presumption of widespread MTBE use. In particular, to control VOC emissions, EPA proposed Phase I limits on Reid Vapor Pressure (RVP), a measure of volatility, for summertime RFG that it believed represented the greatest achievable RVP reduction for Phase I, given the lead time that refiners needed to make investments necessary to lower RVP. EPA based this conclusion on analyses that assumed all summertime RFG would contain MTBE. EPA also proposed a toxics emissions standard based on the

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[11] For example, see paragraph 40, below.

[12] U.S. EPA, *Draft Regulatory Impact Analysis: Reformulated Gasoline and Anti-Dumping Regulations*, July 1991, p. 35 (hereafter "1991 Draft RIA").

[13] 1991 Draft RIA, pp. 35, 38; R. Wilson (EPA), Memorandum to A. Fraas, Re: Reformulated Gasoline Cost Analysis, July 12, 1991, p. 13 of attachment (hereafter "1991 Wilson Memo").

[14] L. Wyborny (EPA), Memorandum to Docket A-92-12, Re: DOE and API Phase II RFG Cost Estimates, November 4, 1993. Attachment C of Mr. Wyborny's memo contains output from EPA's refinery modeling of the RFG standards' costs and energy impacts. Among other things, this output reports the total volume of MTBE, ethanol, and TAME that was expected to be used during Phase I and Phase II in each type of RFG (e.g., regular and premium gasoline) and in each geographic region other than California (EPA did not evaluate the cost of RFG in California in this modeling). The percentages described here are calculated from these reported total oxygenate volumes.

performance of MTBE. EPA explicitly recognized MTBE's superior toxics performance relative to that of other oxygenates, and it believed its proposed standards were appropriate because it expected MTBE to be widely available (see paragraph 26 below). Finally, in discussing its NO_x emissions standard, EPA indicated concern about the potential effects of ethanol use on NO_x emissions (see paragraph 45 below). Consequently, EPA proposed a cap on allowable levels of ethanol in summertime RFG that would have had significant supply implications for refiners choosing to use ethanol in RFG (discussed in the next paragraph).

23. EPA's anticipation of widespread MTBE use in RFG is also made evident by two EPA proposals that sought to increase the amount of ethanol used in RFG. In response to the concern expressed by some parties that EPA's RFG standards would "effectively preclude ethanol from the RFG market," in February 1993, EPA proposed certain adjustments to the RFG standards.[15] These proposed adjustments included changes to the VOC standards that would have had the effect of encouraging limited ethanol use in summer RFG. EPA subsequently abandoned this proposal, replacing it with a second proposal – referred to as the renewable oxygenate requirement – that was finalized but never implemented.[16] The renewable oxygenate requirement would have required that renewable oxygenates (primarily ethanol) make up at least 30 percent of the oxygen content that was required by the RFG standards.

24. EPA's assessment of the renewable oxygenate requirement offers another indication of EPA's expectation that MTBE would be the dominant oxygenate used in RFG. In its assessment of the renewable oxygenate requirement, EPA stated that it "expect[ed] that this minimum requirement w[ould] be met via ethanol and its derivatives," such that ethanol use would increase significantly under the requirement.[17] The very fact that EPA expected this requirement to increase ethanol use in RFG makes clear that EPA expected ethanol use to be lower than the mandated level in the absence of the requirement. In analyzing the renewable oxygenate

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[15] February 26, 1993 NPRM, Section II.

[16] *Regulation of Fuels and Fuel Additives: Renewable Oxygenate Requirement for Reformulated Gasoline*, Final rule, 59 Fed. Reg. 39258 (August 2, 1994) (hereafter "August 2, 1994 Renewable Oxygenate Requirement Final Rule").

[17] U.S. EPA, *Final Regulatory Impact Analysis and Summary and Analysis of Comment For: Renewable Oxygenate Requirement for Reformulated Gasoline*, June 29, 1994, p. 94 (hereafter "Renewable Oxygenate Requirement RIA"). EPA expected that the requirement would increase annual ethanol use by 335 million gallons (at p. 95).

requirement, EPA assumed that the increased ethanol use would displace MTBE, which was expected to "dominate[]" the remaining portion of oxygenate use in RFG.[18]

C. EPA's Expectation of MTBE Use Fundamentally Affected its Assessment of the RFG Standards

25. As described above, the balance that EPA struck among the RFG standards' environmental, economic, and energy implications was based on assessments that anticipated widespread MTBE use. Ethanol and MTBE have substantially different effects on the emissions that EPA sought to reduce through the RFG standards, and they differ in other important respects as well. As a result of these differences, the balance that EPA struck among the RFG standards' environmental, economic, and energy implications depended on its assumption of widespread MTBE use. The exclusive use of ethanol in RFG would have fundamentally altered that balance. While there are several important differences between ethanol and MTBE that affect this balance, here I focus on the different effect of ethanol on toxics emissions, and the different effect of ethanol on gasoline volatility and thereby VOC emissions.

C.1 Ethanol Use Leads to Higher Toxics Emissions than Does MTBE Use

26. While directing EPA to set RFG standards that required the greatest achievable emissions reductions, the CAAA established minimum emissions reduction requirements that RFG had to achieve. These minimum requirements were the greater of either a minimum percent reduction or the emissions reductions that EPA determined could be achieved by a "formula fuel" described in the CAAA. While the CAAA described various key parameters of this formula fuel, including its oxygen content, it did not indicate the type of oxygenate that would be used to add oxygen to this formula fuel.[19] Recognizing, however, that "MTBE yields slightly larger toxics emission reductions than other oxygenates tested to date due to its effect on nonexhaust benzene emissions," EPA proposed the Phase I toxics standard based on the performance of a

[18] Renewable Oxygenate Requirement RIA, p. 92; August 2, 1994 Renewable Oxygenate Requirement Final Rule, Section III.E.1.
[19] Clean Air Act, Section 211(k)(3).

formula fuel containing MTBE.[20] EPA justified this proposal "based on the likelihood that MTBE will be the most heavily used oxygenate," and because, "[s]ince MTBE will be widely available for use in reformulated gasoline, EPA believes it is appropriate to base toxics emission standards on a formula fuel [with MTBE] resulting in the greatest achievable reductions in toxics emissions."[21]

27. The final Phase II RFG standards required RFG to achieve a 20 percent reduction in toxics emissions.[22] However, EPA found that, even though the standards would only require a 20 percent reduction in toxics emissions, "the average toxics reduction [resulting from the Phase II RFG standards] across all refiners will still be above 25% based upon the fuel changes used to comply with the [Phase II RFG] VOC and NO_x standards."[23] That is, EPA concluded that the RFG program would achieve additional toxics reductions above and beyond those required by the toxics standards as a consequence of refiners complying with the VOC and NO_x standards. This conclusion was based on analyses in which EPA assumed widespread MTBE use.[24]

28. In analyzing the impacts of the renewable oxygenate requirement described previously in paragraph 23, EPA found that increased ethanol use in RFG would adversely affect the balance that EPA's RFG standards had struck between reductions in toxics emissions and economic costs. Specifically, EPA concluded that increased ethanol use would diminish the reductions in toxics emissions achieved by the RFG standards, compared with a scenario in which refiners only used MTBE in RFG.[25] According to EPA's analysis, even if ethanol accounted for only 30 percent of the oxygen content in RFG nationwide, more stringent standards would have been necessary to maintain the same reductions in toxics emissions that would be achieved by using MTBE to meet the existing RFG standards. Moreover, EPA concluded that these more stringent standards would have increased the annual costs of the RFG program by tens of millions of dollars.[26] Therefore, if only ethanol were used in RFG, EPA would have had to choose between

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[20] *Regulation of Fuels and Fuel Additives: Standards for Reformulated and Conventional Gasoline*, Supplemental Notice of Proposed Rulemaking, 57 Fed. Reg. 13416 (April 16, 1992), Section II.A.3.e (hereafter "April 16, 1992 SNPRM").
[21] *Id.*
[22] February 16, 1994 Final Rule, Section VI.C.4.
[23] *Id.*
[24] See Section III.B of this report.
[25] Renewable Oxygenate Requirement RIA, p. 109.
[26] *Id.*, p. 111.

accepting a smaller reduction in toxics emissions than could be achieved through the use of MTBE or adopting more stringent toxics standards that EPA believed would impose significantly greater economic costs.

C.2 Ethanol Use Leads to Higher Gasoline Volatility and VOC Emissions than Does MTBE Use

29. One of the most prominent differences between ethanol's and MTBE's effects on emissions arises from ethanol's effect on gasoline volatility and thereby VOC emissions. As I describe below, because of this difference, EPA's expectation of widespread MTBE use not only was fundamental to the balance that EPA struck among the RFG standards' environmental, economic, and energy implications, but was also central to the achievability of those standards.

30. Reductions in gasoline's RVP have been central to achievement of the RFG VOC standards, which are in effect during the summertime. Under EPA's Simple Model, used to demonstrate RFG compliance through 1997, EPA placed direct limits on RFG's RVP to ensure VOC emission reductions. With the transition to EPA's Complex Model in 1998, refiners were no longer bound by a specific RVP limit to demonstrate compliance. Instead, they could make any necessary adjustments to RVP and other fuel parameters to meet the VOC standards, but EPA expected that RVP reductions would remain a primary means of meeting those standards.[27]

31. Blending ethanol with gasoline increases the resulting blend's RVP by 1.0 to 1.4 pounds per square inch (psi), depending on gasoline's RVP before blending.[28] By contrast, MTBE negligibly affects gasoline's RVP. A refiner using ethanol in summer RFG therefore would have to reduce its gasoline's RVP not only down to the level required by the VOC standards, but further still to offset the RVP "boost" that results from adding ethanol to that gasoline.[29]

32. As a result of ethanol's RVP boost, refiners seeking to achieve a given RVP level for RFG must reduce the RVP of the gasoline to which they add ethanol far more than would be the

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[27] February 16, 1994 Final Rule, Section VI.B.2.

[28] U.S. Department of Energy (DOE), Energy Information Administration (EIA), *Potential Supply Impacts of Removal of 1-Pound RVP Waiver*, September 2002, p. 3.

[29] Specifically, refiners using ethanol in RFG must produce a gasoline blendstock (referred to as Reformulated Blendstock for Oxygenate Blending, or RBOB) that has a sufficiently low RVP so that, despite the RVP increase that occurs when the blendstock is combined with ethanol to form RFG, the RVP of the resulting RFG remains below the level required by the VOC standards. See L. Wyborny (EPA), Memorandum to the Record, Re: Cost Estimates of Long-Term Options for Addressing Boutique Fuels, October 22, 2001 (hereafter "2001 Wyborny Memo"), p. 12.

case if they used MTBE instead. Exhibit 2 offers an example using the Phase I summertime RVP standard that EPA set for northern (Class C) RFG areas. As shown in Columns A and D of Exhibit 2, the baseline summertime RVP of gasoline in northern RFG areas (i.e., the RVP level that would have been present absent the RFG standards) was 8.7 pounds per square inch (psi).[30] EPA set an 8.1 psi Phase I RVP standard for northern RFG areas, requiring refiners to reduce their gasoline's RVP to meet this standard. When MTBE is added to gasoline with an 8.1 psi RVP, the RVP of the resulting blend is effectively unchanged.[31] Therefore, if a refiner uses MTBE, as EPA expected in analyzing its standards,[32] the refiner simply would have to reduce the RVP of the gasoline blendstock to which it adds MTBE by about 0.6 psi (from 8.7 to 8.1 psi) so that the RVP of the resulting MTBE-blended gasoline meets the 8.1 psi standard. This required reduction in RVP when a refiner uses MTBE is depicted in Column B. Column C depicts the RVP of the resulting MTBE-blended RFG.

33. In contrast to MTBE, ethanol increases the RVP of the resulting ethanol-blended gasoline by 1.0 to 1.4 psi, depending on the RVP of the gasoline to which it is added.[33] To compensate for this RVP boost, starting from the same initial RVP of 8.7 psi, a refiner using ethanol would have to reduce the RVP of the gasoline blendstock to which it adds ethanol by 1.6 and 2.0 psi to meet the Phase I RVP standards for northern RFG areas. This significantly greater RVP reduction, relative to that required when using MTBE, is necessary to achieve a final RVP of 8.1 psi after ethanol is added. Column E of Exhibit 2 depicts the RVP reduction required to meet the Phase I RVP standards for northern RFG areas when using ethanol. Column F depicts the RVP of the resulting ethanol-blended RFG, differentiating the RVP of the blendstock to which ethanol is added (the grey portion of the column) from the increase in RVP resulting from ethanol's addition (the blue portion). Thus, to use ethanol in RFG, a refiner would have to achieve far

[30] April 16, 1992 SNPRM, Section II.A.1.
[31] Because MTBE has a "blending RVP" of 8.0 psi, if it is added to a gasoline with an RVP lower than 8.0, it will tend to increase the RVP of that gasoline, though by a much smaller amount than would ethanol. For example, when added to gasoline with an RVP of 7.0 psi to form a gasoline blend with 11 volume percent MTBE, the addition of MTBE would increase the resulting RVP by 0.11 psi (11 percent times the 1.0 psi difference between MTBE's 8.0 RVP and the 7.0 RVP of the gasoline to which it is added).
[32] See February 2007 Stavins Report, Section IV.
[33] U.S. Department of Energy (DOE), Energy Information Administration (EIA), *Potential Supply Impacts of Removal of 1-Pound RVP Waiver*, September 2002, p. 3.

greater reductions in the RVP of the blendstock to which it adds oxygenate than is the case when MTBE is used.

34. To reduce RVP, refiners must adjust their refining processes to remove light hydrocarbons from gasoline.[34] EPA recognized that those adjustments materially increase refining costs and can require capital investments, increasing the lead time that refiners need to meet a particular standard.[35] EPA estimated the cost of reducing gasoline RVP from 8.1 to 6.8 psi in its analyses of possible Phase II RFG standards. EPA estimated this cost for Phase II RFG under the presumption that MTBE would be used in this RFG, leading to a final RVP close to 6.8 psi.[36] However, this RVP reduction is also close to the amount of additional RVP reduction, beyond that required when using MTBE, that a refiner would have to achieve simply to meet the Phase I RVP standard for northern RFG areas when using ethanol.[37] EPA estimated that the cost of such an RVP reduction would be 3.39 cents per gallon.[38] In addition to raising refining costs, light hydrocarbon removal reduces the volume of RFG that a refiner can produce.[39] The adverse economic and energy implications associated with offsetting ethanol's RVP effect are avoided through MTBE use.

35. EPA's expectation of widespread MTBE use was a key factor affecting its assessment of the RFG standards. In setting the RFG VOC standards, the balance that EPA struck among the standards' environmental, economic, and energy implications was based on the assumption of widespread MTBE use and would have been fundamentally altered by the exclusive use of ethanol in RFG. Indeed, as I describe in the next section, in light of ethanol's RVP effect, EPA's analysis indicates that its Phase I VOC standards for RFG would have been unachievable if only ethanol were used in RFG. Moreover, even if those standards would have been achievable if only ethanol were used in RFG, the implications of the VOC standards for emissions, economic

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[34] 2001 Wyborny Memo, pp. 5-12.
[35] For example, see 1991 Draft RIA, p. 38; April 16, 1992 SNPRM, Section II.A.1 (discussed at paragraph 40, below); February 26, 1993 NPRM, Section II.A.2.
[36] U.S. EPA, *Draft Regulatory Impact Analysis for the Notice of Proposed Rulemaking of the Complex Model, Phase II Performance Standards, and Provisions for Renewable Oxygenates*, February 5, 1993 (hereafter, "February 1993 EPA Draft RIA"), p. 141.
[37] U.S. DOE, EIA, *Potential Supply Impacts of Removal of 1-Pound RVP Waiver*, September 2002, p. 3.
[38] For example, see February 1993 EPA Draft RIA, , p. A-V-11. The 3.39 cents per gallon estimate is equal to 2.5 cents per gallon per 1 psi RVP reduction, times a reduction of 1.3 psi.
[39] 2001 Wyborny Memo, pp. 5-12.

states that "MTBE-blended [Phase II summer] RFG can be produced by only removing butanes, but for producing an RFG blendstock for blending with ethanol, pentanes would have to be removed to account for the RVP boost of ethanol."[44] Thus, if only ethanol were used in Phase II RFG, the resulting gasoline volume loss associated with meeting the RFG standards would be far more significant than EPA anticipated based on its expectation of widespread MTBE use.

39. As certain states and the federal government contemplated phasing out MTBE use in gasoline, several studies were performed to examine the gasoline supply implications of replacing MTBE with ethanol.[45] These studies underscored the concern and attention that has been given to the gasoline supply impacts associated with exclusive use of ethanol in RFG.

D. According to EPA's Analysis, the Phase I VOC Standards Were Unachievable Using Only Ethanol

40. Seeking to require the greatest reduction in VOC emissions achievable, taking into consideration costs, energy requirements, and other factors, in its April 1992 SNPRM, EPA proposed VOC standards that would limit the summertime RVP of Phase I RFG to 7.2 psi in southern states (Class B areas) and 8.1 psi in northern states (Class C areas).[46] Relying on analyses predicated on the assumption that all summer RFG would contain MTBE,[47] EPA stated that its proposed standards were "achievable considering costs … and the energy implications."[48] EPA finalized these standards in its February 16, 1994 final rule.[49]

41. However, EPA's April 1992 discussion of the Phase I VOC standards also indicated that they would not have been achievable if refiners used only ethanol in RFG. EPA stated that it "believe[d] that the 1995 [Phase I] implementation date provide[d] insufficient leadtime for refiners to comply with a more stringent [RVP standard]" than EPA had proposed.[50] That is, while explicitly anticipating that only lower-volatility MTBE would be used in summer RFG,

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[44] 2001 Wyborny Memo, p. 12.
[45] For example, see U.S. DOE, EIA, *Supply Impacts of an MTBE Ban*, September 2002; Stillwater Associates, Inc., *MTBE Phase Out in California*, March 2002, prepared for the California Energy Commission (P600-02-008CR).
[46] April 16, 1992 SNPRM, Section II.A.1. These standards were less stringent than the Phase II standards that came into effect in 2000.
[47] 1991 Wilson Memo; 1991 Draft RIA, pp. 35, 38.
[48] April 16, 1992 SNPRM, Section II.A.1.
[49] February 16, 1994 Final Rule, Section III.A.
[50] April 16, 1992 SNPRM, Section II.A.1.

EPA recognized that its proposed standards provided for the maximum achievable RVP reduction (i.e., the lowest achievable RVP level), given the time available to make investments necessary to meet the standards. Given ethanol's RVP boost, to meet those same standards while using only ethanol, refiners would have had to achieve far greater reductions in RVP than EPA deemed achievable during Phase I. Therefore, EPA's analysis indicates that the Phase I standards would have been unachievable if refiners relied exclusively on ethanol.

42. To be specific, in the absence of the RFG standards, the baseline RVP of gasoline was 7.8 psi in Class B RFG areas and 8.7 psi in Class C RFG areas.[51] As noted above, EPA's proposed VOC standards would limit the summertime RVP of Phase I RFG to 7.2 psi in Class B areas and 8.1 psi in Class C areas. Therefore, if refiners used MTBE in their RFG — as EPA anticipated — they had to reduce the RVP of their gasoline by about 0.6 psi in both Class B and C areas to meet the Phase I VOC standards (Column B of Exhibit 2), *not* the 1.6 to 2.0 psi reduction (0.6 psi plus the 1.0 to 1.4 psi reduction necessary to offset ethanol's RVP boost) that would be required if refiners instead used ethanol (Column E of Exhibit 2). In the above quotation from its April 1992 SNPRM, EPA effectively was stating that 0.6 psi was the maximum reduction in RVP that refiners could achieve during Phase I. Thus, by EPA's own assessment, the achievability of the Phase I VOC standards depended on refiners being able to use MTBE and thereby avoid the need to offset ethanol's RVP boost.

43. Given that EPA explicitly recognized the different implications of MTBE and ethanol use for gasoline volatility,[52] and given that EPA indicated that refiners could not achieve RVP reductions greater than 0.6 psi during Phase I, by EPA's own assessment, its chosen standards effectively required widespread use of MTBE. EPA set those standards because it was seeking to achieve the greatest reduction in emissions, taking into consideration costs, energy requirements, and other factors, as required by the CAAA.

44. In his report, Mr. Tallett mischaracterizes my statements on EPA's assessment of the achievability of Phase I VOC standards. In the above paragraphs and in my February 2007 report which Mr. Tallett criticizes, I demonstrate that, according to EPA's own analyses, the

[51] April 16, 1992 SNPRM, Section II.A.1.
[52] For example, see February 26, 1993 NPRM, Section II.A.2.

Phase I VOC standards effectively required "widespread" use of MTBE and would have been unachievable if refiners relied on ethanol *alone*. I did not argue, as Mr. Tallett claims, that EPA's standards "effectively precluded" ethanol use[53] or that the Phase I VOC standards would have been unachievable if refiners had used *any* ethanol. It would be reasonable to expect that some refiners, particularly those in the Midwest – where, as Mr. Tallett states, ethanol is cheaper than MTBE – would have used ethanol. The fact that ethanol was used by a limited number of refiners located in the Chicago region offers no insight regarding the feasibility of all refiners relying on ethanol as early at 1995. Mr. Tallett's claims are irrelevant to both my conclusions and EPA's conclusions.

E. Both EPA and Certain State Regulatory Authorities Expressed Concern about Ethanol Use in RFG

45. In the course of developing the RFG standards, EPA took certain actions and made particular statements that indicated concern about the use of ethanol in RFG. In April 1992, EPA expressed concern that ethanol use in RFG would lead to greater NO_x emissions than would MTBE use: "currently available data … suggests that MTBE may contribute little or no NO_x increase … but that ethanol at a concentration of [10 percent by volume] may cause a NO_x increase."[54] As a result, EPA proposed to limit the volume of ethanol that could be used in a gallon of summer RFG to just 6 percent, while allowing as much as 15 percent MTBE in each gallon.[55]

46. As I described in paragraph 23, in February 1993, EPA proposed an adjustment to the VOC standards to encourage limited ethanol use in summer RFG.[56] A primary motivation for EPA's subsequent abandonment of that proposal was EPA's recognition that increased ethanol use in summer RFG would lead to greater VOC emissions than if only MTBE were used.[57] As a result of this concern, the second proposal that EPA developed to encourage ethanol use — the

[53] December 2008 Tallett Report p. 16.
[54] April 16, 1992 SNPRM, Section II.A.2.
[55] *Id.* EPA's proposed limitations related to the contribution of MTBE and ethanol to RFG's oxygen content. These limitations, expressed in terms of oxygen content, by weight, also can be expressed in terms of the volume limitations described here.
[56] February 26, 1993 NPRM, Sections II.A.2 and II.B.
[57] February 16, 1994 Final Rule, Section II.B.

renewable oxygenate requirement — clearly stipulated that ethanol use would count toward the renewable requirement only if it occurred outside the summer season.[58] In August 1994, EPA described its motivation for not granting credit to summertime ethanol use by stating that "a program which would encourage increased use of ethanol … in summer RFG introduces a number of serious concerns related to increased VOC emissions."[59]

47. By only encouraging ethanol use in winter RFG, EPA's renewable oxygenate requirement sought to increase ethanol use in a manner that would minimize the adverse implications of ethanol's effect on gasoline volatility. However, even this proposal to increase ethanol use caused concern among certain state regulatory authorities. For example, citing various concerns about the effect of ethanol use on emissions, the NY DEC stated that "we do not find that the proposed rule provides adequate insurance that the full benefits of the reformulated gasoline program will be realized in New York State," and that "there appears to be a significant potential to degrade air quality should the current proposal be adopted."[60] In addition, the NY DEC expressed "concerns regarding … the energy-related consequences and economics of the proposed rule," and concluded that the proposal will have "real costs … which will have adverse economic impacts on New York State."[61] Responding to the same proposal, the NESCAUM, an association of northeast state air pollution control agencies, stated, "It seems that EPA may be proposing a solution to the problem of assuring ethanol a major role in the RFG program while at the same time potentially creating a situation in which air quality is adversely impacted."[62] NESCAUM also expressed concern about the costs of requiring increased ethanol use in RFG.[63]

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[58] August 2, 1994 Renewable Oxygenate Requirement Final Rule, Section III.C.2.
[59] *Id.*
[60] T. Allen (New York Department of Environmental Conservation), Letter to the U.S. EPA Re: Proposed Rulemaking for Regulation of Fuels and Fuel Additives: Renewable Oxygenate Requirement for Reformulated Gasoline, February 22, 1994 (hereafter "NY DEC February 22, 1994 Letter").
[61] NY DEC February 22, 1994 Letter.
[62] M. Bradley (NESCAUM), Letter to P. Machiele (EPA), February 11, 1994.
[63] *Id.*